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ABSTRACT

Nine recommendations of the Advisory Commission on Articulation Between Secondary Education and Ohio Colleges are presented. The major areas of concern are: a college preparatory curriculum; teacher preservice and inservice education; and communication within the educational community, as well as with students and their parents. Included with the recommendations are statements of existing problems concerning the curriculum, teachers, and communication, along with suggested implementation strategies for both state- and local-level action. The Commission was charged with identifying collegiate expectations for entering students in order to reduce the need for remedial coursework during college. Appendices include: a statement of the purpose of the Commission, the text of the Ohio law governing college entrance requirements, a list of resource group members appearing before the Commission, recommendations for language skills that should be developed through English instruction, a list of mathematical skills that should be mastered before the study of alegebra, a list of the content areas that should be covered by high school mathematics courses, and a list of the recommended number of years of high school mathematics needed for various baccalaureate programs. (SW)

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REPORT:

ADVISORY COMMISSION ON ARTICULATION BETWEEN SECONDARY EDUCATION AND OHIO COLLEGES

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Advisory Commission on Articulation between Secondary Education and Ohio Colleges

Abstract

The Ohio Board of Regents and the State Board of Education jointly appointed a 15 member Advisory Commission on Articulation between Secondary Education and Ohio Colleges. The Commission was charged with the task of developing a college preparatory curriculum that would clearly reflect collegiate expectations for entering students and, when followed, would reduce the need for remedial coursework at the collegiate level.

The Commission reaffirmed that it is vitally important for all students to be given the necessary academic tools in light of the fact that more students complete high school and considering the expansion of equal educational opportunities for all students, particularly for minority and disadvantaged youth at the college level. It became evident that the problems of articulation, as well as their solutions, are multi-faceted bridging the secondary and collegiate levels of education.

The Commission recognized that a number of students are leaving high school unprepared for collegiate level work, particularly in the areas of English composition and mathematics. Although courses are in place in most high schools, students may choose not to take them realizing that college entrance is not contingent upon courses taken. Lack of motivation, poor study skills, misunderstanding of college requirements and late decisions to attend college all contribute to students being ill-prepared academically.

The lack of clearly stated academic requirements by colleges and universities is reflected in the variance of topics taught in the college preparatory courses in Ohio's high schools. In addition, the college preparatory curriculum may not enjoy the prestige and emphasis it once had in secondary education.

The Commission further recognized the essential role of the teacher in the preparation of students for college. The adequacy of teacher education and the effectiveness of inservice education are critical concerns.

In Ohio's public colleges and universities, there are no admission standards beyond the high school diploma. Furthermore, no common definition of remediation is accepted statewide. Consequently, the need exists to greatly strengthen communication among the various educational communities and levels, especially as it relates to the college preparatory curriculum.

From the study three major areas emerged and became the focus for the Commission's recommendations:

1. A college preparatory curriculum.
2. Teacher preservice and inservice education.
3. Communication within the educational community, as well as with students and their parents.

Implementation strategies for each recommendation may be found in the full report. The recommendations are as follows:

Recommendation 1	The college preparatory curriculum should include 4 units of English and a minimum of 3 units of mathematics, one of which should be taken in the senior year, as outlined in the reports of the English and Mathematics Task Forces (Appendix D). It is also suggested that 3 units of social studies, 3 units of science, and 3 units of foreign language complete the college preparatory curriculum (Appendix E).
Recommendation 2	The college preparatory curriculum in mathematics and English, as noted in Appendix D, should be agreed to by all post-secondary institutions in Ohio. All Ohio high schools should see that their curricula cover the topics outlined in these programs of study.
Recommendation 3	Private and state-assisted four-year colleges and universities should *require* that students who wish to be admitted to their institutions on an *unconditional* basis must have successfully completed all the requirements of a college preparatory curriculum.

Recommendation 4 — Teacher certification requirements should reflect a greater emphasis on major subject matter content areas. This emphasis on content areas should also be carried over to inservice education as well as recertification requirements.

Recommendation 5 — Teacher education activities and communications should emphasize the need for high school students to write more in all subjects and especially in English classes. In addition, teachers should enforce more rigorous work requirements in order to reduce grade inflation at all educational levels.

Recommendation 6 — Academic requirements should be clearly communicated to educators at all levels. It is particularly important that college requirements be communicated to schools which include grades 7-12. The focus should be on defining and meeting the goals of the college preparatory curriculum (See Appendix E for all course selections), especially in the basic skills areas of English and mathematics (Appendix D).

Recommendation 7 — The college preparatory curriculum should be clearly explained by teachers, counselors, and administrators to the parents of secondary students, the students, and the general public. The consequences of not taking the college preparatory program should also be outlined.

Recommendation 8 — Schools should establish a written policy regarding procedures for obtaining information, establishing conference dates, and attending meetings related to college entrance. This policy should be disseminated to students in grades 7-12 and their parents.

Recommendation 9 — The Ohio Board of Regents and the State Board of Education should create an Advisory Council for College Preparatory Education whose major responsibilities would be to:

(1) Report the progress on implementing the above recommendations.
(2) Evaluate the success of these recommendations. A follow-up study of students' academic careers through college should be made.
(3) Assist regional articulation consortia.
(4) Undertake any additional study of the college preparatory program components sought by the Ohio Board of Regents and the State Board of Education.

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Definitions

Articulation: The process whereby the educational programs, expectations, and requirements at all levels are coordinated to affect a smooth transition for students moving from elementary to secondary to higher education.

Basic Skills: Reading, writing, and mathematics, which are the educational tools for all learning.

Collegiate Remedial Coursework: Below college level classes in mathematics and English offered by post-secondary institutions.

Competence: Demonstrated performance of academically related skills and knowledge.

Developmental Education: The process of filling educational gaps for students who, for a variety of reasons, have not been exposed to high school level courses in basic skills areas.

Expectations: The level of academic achievement believed to be appropriate for students entering a particular educational level.

Grade Inflation: The awarding of higher grades than would be reasonably warranted by the student's actual academic performance.

Inservice Education: Learning activities undertaken by professionally employed teaching personnel either through staff development to improve the institution or professional development to improve personal skills or knowledge.

Open Admissions: A part of Ohio law stipulating that no test can be used as a condition of admission to Ohio's state-assisted colleges and universities.

Remediation: The process of teaching academic material to which students have already been exposed, but which they have not learned in accordance with higher education expectations. Also, the process of assisting students who have turned to higher education later in life and need help in regaining adequate basic skills.

Stop-out: A college student who interrupts his or her college education for a period of months or years, but who, in all probability, will return to continue that college education.

Unconditional admission: For those students who have completed the college preparatory course of study, special consideration would be given upon entry into Ohio's public and private four-year colleges and universities. Such consideration could include student choice regarding taking placement examinations upon entry, choice of quarter of entry or other such actions selected by colleges and universities.

Advisory Commission on Articulation Between Secondary Education and Ohio Colleges

Background

On September 26, 1980, the Ohio Board of Regents and the State Board of Education jointly appointed the Commission on Articulation between Secondary Education and Ohio Colleges and charged them with the task of developing a college preparatory curriculum that clearly defines collegiate expectations for entering students and, when followed, may reduce the need for remedial coursework at the collegiate level.[1]

The creation of this Commission reflected Ohio's concern for an academic problem that is national in scope. During the 1970's, many articles appeared in both the professional and popular press decrying the lack of basic academic skills in young adults. Citing falling test scores and increasing enrollment in collegiate level remedial coursework, the articles focused on two critical areas: lack of mathematical skills and insufficient grasp of reading and writing skills among college-bound high school students.

In Ohio, the concern for competency was voiced at PTA meetings, discussed by high school faculties, and analyzed at school board meetings. At the post-secondary level, it was examined by mathematics and English faculties, debated in faculty senates, and reviewed by Boards of Trustees. The Ohio General Assembly, in response to mounting public concern on this matter, first mandated a study of remediation by the Ohio Board of Regents and then offered several bills designed to improve student skill levels through competency-based education, and/or competency testing. For a variety of reasons, and whether reached through study or experience, the general conclusions of these analyses were the same: many of today's high school graduates require additional academic work to prepare them for college.

The State Board of Education, with its responsibility for primary and secondary education, and the Ohio Board of Regents, with its coordinating responsibility for post-secondary education, agreed that an in-depth examination of this matter was vitally important and required a cooperative stance. In an unprecedented action in Ohio, these Boards jointly sought to define a college preparatory curriculum for Ohio students that would provide the basis for a better transition from high school to college.

The resulting Commission on Articulation between Secondary Education and Ohio Colleges was composed of 15 educators and citizens knowledgeable about various aspects of articulation needs in Ohio. The members sought further information from resource groups provided by high schools and colleges throughout Ohio and from students themselves (see Appendix C for a listing of resource group members appearing before the Commission). The presentations of the resource groups focused on the Commission's main task of defining a college preparatory program that would, if followed and the content learned, preclude the need for remedial coursework at the collegiate level.

The task was by no means easy. The issues surrounding academic preparedness are complex and deep. It would certainly be a mistake to dismiss the problem only as inadequacy on the part of the schools in preparing students for higher education, as personal failure on the part of students, or as negligence on the part of colleges in providing sufficient advice to schools regarding collegiate standards and expectations. Unfortunately, the milieu of unpreparedness is a more complex issue than such simplistic explanations suggest.

The Problem: Complex and Deep

Several problems with the college preparatory curriculum in our high schools have been elaborately defined by those testifying before the Advisory Commission. Beginning with the necessity for remedial high school work at the college level, educational representatives specified one problem as general weakness in high school preparation in basic mathematical skills and in English composition. A large number of high school graduates who go on to college cannot read or write at a satisfactory level for college work.

The problem further involves insufficient competence in reasoning, analysis, critical thinking and oral expression. Factors cited as contributing to these shortcomings were poor study habits, hedonistic value systems, short class periods, inability to enforce homework assignments, too much student choice, inability of counselors and parents to persuade students to take difficult courses, low student motivation, poorly prepared teachers, and late decisions to attend college.

Repeatedly, however, those testifying before the Commission have insisted that curriculum is not the total problem and that merely tamper-

[1] Charge to the Commission appears in Appendix A.

ing with curriculum will not improve the situation. Fundamentally, students do not take the college preparatory curriculum, or schools do not make that curriculum sufficiently rigorous, because of extensive and widespread confusion as to what colleges and universities require for admission. While state law does permit public universities to require a specified preparatory course for admission,[2] the fact is that anyone can enter a state college or university, regardless of the courses taken in high school or the record made there.

With a projected decline in the number of high school graduates from 1980 to 1993 and with the necessity for state universities to maintain their enrollments to qualify for state subsidies, it is extremely doubtful, apart from new legislation, that the majority of institutions will tighten admission standards in any way. Clearly, the college preparatory course will be further weakened as a result of these loose standards unless specific measures are taken. The problem becomes even more critical at this time because of a variety of other current trends that exacerbate the situation. Tight economic conditions and declining student populations are leading to retrenchment programs in the secondary schools that further undermine college preparatory education. This is frequently manifested by increased class sizes and declining quality of education on one hand and by under-enrollment in college preparatory classes, which results in their elimination, on the other.

As a further debilitating factor in the situation, the teaching profession is becoming increasingly less attractive because of salary levels and working conditions. Career opportunities for men and women in business and other fields are far more attractive than those in teaching. In fact, many very competent teachers are leaving the profession, and some of the most promising candidates for teaching are opting for other careers. Given the decline in college enrollment projected from now until 1993, it is extremely doubtful that sufficient numbers of competent students will be attracted into education. This is especially true in science and mathematics, which makes the potential shortage even more critical.

Because of the nonexistent admissions standards (beyond a high school diploma) in most public colleges and universities, the retrenchment in secondary school systems, and the declining attractiveness of the teaching profession, immediate steps must be taken to avoid further damage to the public educational system, the college preparatory course included.

Note that private colleges are not immune to these problems. Many private colleges are equally remiss in not requiring adequate preparation for admission. Unfortunately, all institutions, whether public or private, that seek to uphold standards may find themselves at an increasing disadvantage in competing with those institutions which do not.

A wasteful overexpansion of educational facilities and debilitating competition for a limited number of students has characterized higher education in Ohio. The end result is an undermining of both secondary and higher education as sheer competition for survival destroys standards for all but the most heavily endowed colleges. For the most part, the lack of entrance requirements at public colleges and universities seems to have discouraged establishing high school standards for college bound students.

A Word of Caution: Seeking Academic Competence in a Democracy

While there are many problems in education today, there have also been great educational achievements in recent decades and, in addressing competency problems, care must be taken not to reverse these positive trends. A dramatic increase in the number of students who finish high school and go on to college has been attained. A carefully constructed public educational system has evolved that provides greater educational opportunity for the deprived, the disadvantaged, the slower learner, the handicapped, the vocationally oriented, and the undecided. Special efforts should continue to bring all students, and particularly minorities and the disadvantaged, to the appropriate level of achievement for optimum decision making among academic choices.

In the effort to address these important needs, however, the college preparatory course has perhaps been overlooked, or at least taken for granted, and has consequently been weakened. While we need to refocus attention on that aspect of the high school program, this does not require a lesser commitment to education for a heterogeneous and pluralistic population.

We should not curtail freedom of choice or minimize efforts to serve a variety of students. Therefore, it is vitally important for all students to be given the necessary academic tools. We must examine new dimensions of access to

[2] The Ohio law governing college entrance requirements of high school graduates can be found in Appendix B.

higher education, which includes more than mere proximity to a campus. Access also involves being able to do college level work leading toward a useful college education.

Even if the problems of articulation between high school and college are resolved, the need for developmental education will continue for students who decide later to attend college. The dropout, stop-out, or redirected student will continue to need remedial and developmental work.

Although the solutions to the issues surrounding unpreparedness are not easy, there are potential actions that will assist in alleviating some of the problems in the future. The Commission's recommendations, which follow, outline actions relevant to curriculum, teachers and communication networks.

Recommendations

Introduction

There are several assumptions which appear basic to the Advisory Commission's recommendations.

- The acquisition of basic skills in elementary school is essential to successful matriculation to secondary school.
- An academically challenging senior year in high school is important in making a successful transition to college level work.
- Students need continual guidance and skill training in decision-making activities beginning in primary school with parents encouraged to be part of this decision-making process.
- Leadership from school board members and administrators is essential in establishing and attaining college preparatory curriculum goals.
- Competent teachers are needed at all levels.
- High school students will benefit from the articulation of requirements by colleges and universities to secondary schools.
- Adequate funding is necessary to achieve desired change.
- Existing and impending legislation would not impede implementation of the Commission recommendations.

The following recommendations are presented by the Advisory Commission in support of a strong college preparatory course of study in high school which would be specially recognized for college entrance. The recommendations fall into three categories: Curriculum, Teachers, and Communication. Included with each recommendation are suggested implementation strategies for both state and local level action.

Curriculum

Problem

The students who enter Ohio's colleges and universities have a variety of backgrounds in English and mathematics. Students differ considerably in the content of their high school courses, the amount of coursework completed, and the levels of learning in basic skills. Because of this, and in light of Ohio's open admissions policy, colleges have, of necessity, provided multiple levels of freshman courses to accommodate all students, including those who need remedial work.

At the remedial end of the spectrum, the cost of duplicating high school level courses in college and the extra time students must take to achieve college level status strongly suggest the need for a clearly defined college preparatory course to be taken by those high school students who plan to enter college.

Recommendation 1

The college preparatory curriculum should include 4 units of English and a minimum of 3 units of mathematics, one of which should be taken in the senior year, as outlined in the reports of the English and Mathematics Task Forces (Appendix D). It is also suggested that 3 units of social studies, 3 units of science, and 3 units of foreign language complete the college preparatory curriculum (Appendix E).

Recommendation 2

The college preparatory curriculum in mathematics and English, as noted in Appendix D, should be agreed to by all post-secondary institutions in Ohio. All Ohio high schools should see that their curricula cover the topics outlined in these programs of study.

Recommendation 3

Private and state-assisted four-year colleges and universities should *require* that students who wish to be admitted to their institutions on an *unconditional* basis must have successfully completed all the requirements of a college preparatory curriculum.

Implementation Strategies

State

- The State Board of Education Standards for Elementary and Secondary Education should include the requirements of a college preparatory course of study.
- The State Board of Education Standards for Elementary and Secondary Education should stipulate that each year of English in the college preparatory curriculum require significant assignments in composition.
- The State Board of Education Standards for Elementary and Secondary Education should include the course requirements for college preparatory students as outlined in Recommendation 1 of this report.
- The State Board of Education Standards for Elementary and Secondary Education should require that mathematics be taken in the senior year of high school.
- The State Board of Education should encourage all high schools to review their college preparatory course of study to ensure that the topics outlined in Appendix D are covered.
- The Ohio Board of Regents should encourage the adoption of the Mathematics and English Task Force reports on the college preparatory curriculum (Appendix D) by all collegiate institutions in Ohio.
- The Ohio Board of Regents and the State Board of Education should offer college placement tests in mathematics (similar to that developed by The Ohio State University) to college bound students in their junior year of high school. Test results would be used in counseling students regarding the scheduling of senior year mathematics.

  A similar test for English composition and reading comprehension should be developed and administered.

Local

- High schools and colleges should use the mathematics and English college preparatory programs as contained in Appendix D for study and discussion for refining any local requirements they may establish.
- Boards of education should establish curricula, course content and objectives, and testing procedures for measuring achievement of those objectives for reading, writing and mathematics. The curricula objectives and test procedures should be established after reviewing recommendations from college and university faculties and after considering the college preparatory curriculum contained in Appendix D.
- Colleges and universities may use the State Board of Education Award of Distinction as a means of verification that a student has taken the college preparatory program.
- Boards of education should provide remedial assistance for those students who do not meet course objectives in reading, writing, and mathematics.
- Boards of education should provide training in subject content areas for college preparatory teachers to help them obtain updated information and new techniques.
- Boards of education should provide appropriate textbooks and equipment to support the college preparatory curriculum.

- Colleges and universities may give credit for all successfully completed coursework. However, remedial coursework should not necessarily provide credit toward graduation.

Teachers

Problem

The teacher is an essential part of any consideration in prescribing a college preparatory curriculum. The dependence of students on the teacher for content knowledge is such a crucial element in preparing students for higher education that it cannot be overemphasized. Thus, how the teacher is prepared and kept current in fulfilling this responsibility is critical in formulating course components for high school students who will be entering Ohio's colleges and universities. Proper preparation is not only important during the time teachers are working toward their first degree and initial certification, but also during their active involvement in classroom activities and in meeting recertification requirements. The importance of inservice education has taken on additional significance with increasing concerns that teachers have a strong background and current awareness in the subject matter they are teaching in order to prepare students adequately for future educational activities.

A teacher's assessment of a student's work does not always accurately measure that student's knowledge of the subject. Generally, this becomes a problem when a high school student, given a passing grade or in some cases an above-average grade, is not able to perform the functions necessary to succeed in subsequent courses whether in high school or college. This is commonly known as grade inflation.

Inadequate knowledge of subject matter, for both teachers and students, may also be compounded by the fact that it is difficult to attract and retain competent teachers. This is a very broad but basic issue affected by salaries, working conditions, greater respect, and other incentives to remain in the profession and improve the educational process through improved teaching skills.

Recommendation 4

Teacher certification requirements should reflect a greater emphasis on major subject matter content areas. This emphasis on content areas should also be carried over to inservice education as well as recertification requirements.

Recommendation 5

Teacher education activities and communications should emphasize the need for high school students to write more in all subjects and especially in English classes. In addition, teachers should enforce more rigorous work requirements in order to reduce grade inflation.

Implementation Strategies

State

- The State Board of Education and the Ohio Board of Regents, in cooperation with the colleges and universities throughout the state, should change the requirements for teacher education training. The modified requirements should place a strong emphasis on major academic or subject matter content areas and remove any current barriers that may restrict participation in content area classwork.
- The State Board of Education and the Ohio Board of Regents should establish guidelines to improve inservice education activities and to overcome the present trend in grade inflation at all levels of education.

Local

- Boards of education should seek to provide incentives for teachers to take more classes in the academic content areas in which they teach, even if it means the teacher is taking more undergraduate, as opposed to graduate level, courses.
- Teachers and administrators should develop curricula plans to encourage student writing on a daily basis.

- Boards of education should provide special recognition for teachers and administrators who participate in articulation activities with colleges and universities as well as with other educators within their own school district.
- Colleges and universities should take advantage of the new state teacher education standards which allow contractual agreements between colleges and school systems to develop a variety of mutually beneficial programs that enhance articulation between high schools and colleges.

Communication

(Elementary - Secondary - University)

Problem

In the course of their education, students progress from elementary to secondary to collegiate institutions, but there is no ongoing or clear dialogue among these institutions regarding student academic requirements. With notable and praiseworthy exceptions, no formal, systematic communication network exists to ensure that educational institutions at all levels communicate their expectations for incoming students. Consequently, those who teach and counsel secondary students find it difficult to provide appropriate direction and recommend proper preparation. As a result, students may not choose their high school curriculum wisely.

Recommendation 6

Academic requirements should be clearly communicated to educators at all levels. It is particularly important that college requirements be communicated to schools which include grades 7-12. The focus should be on defining and meeting the goals of the college preparatory curriculum (See Appendix E for all course selections), especially in the basic skills areas of English and mathematics (Appendix D).

Implementation Strategies

Local

- Using regional consortia, colleges and schools should establish formal faculty communication links with one another for articulation purposes.
- Colleges and schools should promote collaborative efforts in curriculum design and develop ways to translate educational research results into application and practice.
- Mathematics and English faculty exchanges and research dissemination in basic skills areas should be formalized and recognized.
- Using the regional consortia and their publications, colleges should clarify their entrance requirements so that high schools which send them students will clearly understand the requirements.
- Colleges should keep high schools informed on how their graduates perform in college.

Communication

(Schools, Teachers, Counselors, and Administrators)

Problem

Because of Ohio's open admissions system in its public institutions and because declining enrollments have eased admissions standards in many private colleges, students, and often their parents, act under the belief that strict adherence to a college preparatory high school program is not necessary for college enrollment. While, in fact, such students who do not adhere to a college preparatory high school program can enter post-secondary education, they may face great difficulty in doing the work.

Recommendation 7

The college preparatory curriculum should be clearly explained by teachers, counselors, and administrators to the parents of secondary students, the stu-

dents, and the general public. The consequences of not taking the college preparatory program should also be outlined.

Implementation Strategies

Local

- Schools should improve communication with parents regarding college admission requirements by providing appropriate course of study planning for the college-bound student. Such planning should *clearly explain* the ramifications (both personal and financial) of remedial coursework at the collegiate level.
- High school educators should carefully counsel students, early and often, regarding college requirements and communicate to parents the differences in student options in high school (college preparatory, vocational, and general).
- High school educators should make it clear to students who do not take the college preparatory course that they will not be unconditionally accepted into college and will probably need to undertake remedial or developmental education work if they do decide to go to college.
- High school educators should use test results to help students recognize their academic weaknesses, which can then be corrected while students are still in high school.

Communication

(Students and Parents)

Problem

Students and their parents often feel uninformed about options within the high school curriculum. There is a strong need for school personnel to communicate openly with parents and students, especially during the key decision-making periods of course selection, college visitations and presentations, and financial need planning.

Recommendation 8

Schools should establish a written policy regarding procedures for obtaining information, establishing conference dates, and attending meetings related to college entrance. This policy should be disseminated to students in grades 7-12 and their parents.

Implementation Strategies

Local

- Each board of education should develop and publish procedures for parental meetings with counselors, teachers, and administrators. The policy statement should be disseminated annually to parents of students in grades 7-12.
- Each board of education should provide the opportunity for parents to attend their child's course selection conference.
- Each school administrator should promote interaction between teachers and students specifically related to career decision making, future course selection, and college requirements.

Communication

(Advisory Council on College Preparatory Education)

Problem

The recommendations of the Commission on Articulation repeatedly emphasize the need for coordination between secondary and post-secondary educators. There is a continued need for a cooperative relationship between the Ohio Board of Regents and the State Board of Education. Such a formalized relationship would benefit from the advice of parents, teachers, professors, superintendents, principals, college administrators, school board members, and legislators.

Recommendation 9

The Ohio Board of Regents and the State Board of Education should create an Advisory Council for College Preparatory Education whose major responsibilities would be to:

(1) Report the progress on implementing the above recommendations.

(2) Evaluate the success of these recommendations. A follow-up study of students' academic careers through college should be made.

(3) Assist regional articulation consortia.

(4) Undertake any additional study of the college preparatory program components sought by the Ohio Board of Regents and the State Board of Education.

Implementation Strategies

State

- The State Board of Education and the Ohio Board of Regents should appoint an Advisory Council on College Preparatory Education by July 1, 1981.

APPENDIX A

Charge to Advisory Commission on Articulation Between Secondary Education and Ohio Colleges

The Advisory Commission on Articulation is charged with formulating recommendations for determining the essential course components for high school students who plan to enter Ohio's colleges and universities. Exposure of high school students to the college preparatory curriculum should prepare students fully for college level work. It should negate the need for any remedial coursework at the college level and be acceptable to colleges and universities as an appropriate course of study.

Following determination of such a proposed program of study, the Advisory Commission shall develop recommendations for the implementation and communication of such a curriculum so as to assure full articulation between Ohio's secondary and post-secondary school systems. In this process of both recommending the course components and implementing and communicating the existence of any changes, the Commission should utilize resource groups as may be made available to them through the offices of the State Department of Education and the Ohio Board of Regents. The Commission will be empanelled on September 26, 1980, and will complete its function with the submission of its report by March 31, 1981. The records of the Commission will be filed with the appropriate State Agencies.

APPENDIX B

Ohio Revised Code: 3345.06

(College) Entrance Requirements of High School Graduates

A graduate of the twelfth grade shall be entitled to admission without examination to any college or university which is supported wholly or in part by the state, but for unconditional admission may be required to complete such units not included in his high school course prior to his entrance, by the faculty of the institution.

This section does not deny the right of a college of law, medicine, or other specialized education to require college training for admission, or the right of a department of music or other art to require particular preliminary training or talent.

APPENDIX C

Resource Group Members Appearing Before the Advisory Commission on Articulation Between Secondary Education and Ohio Colleges

October 22, 1980

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Bexley, Ohio

Mr. Earl Tharp, Mathematics Supervisor
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Mr. Robert Wolfe, Mathematics Teacher
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Post-Secondary Education

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Dr. David Deever, Chairman,
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Dr. John Pfetzing, Department of Mathematics
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Ms. Christine Nine, English Teacher
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Ms. Peg Ray, Coordinator of Programs
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Post-Secondary Education

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Cleveland State University
Cleveland, Ohio

Dr. Joanne Petrick, Chairperson
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Ohio Dominican College
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Dr. Carole A. Pollard,
Head of Communicative Skills Department
Stark Technical College
Canton, Ohio

November 11, 1980

Principals of Secondary Schools

Mr. David Shelby, Principal
Upper Arlington High School
Upper Arlington, Ohio

Mr. Rick Studer, Principal
North Union High School
Richwood, Ohio

Mr. Edward Willis, Principal
East High School
Columbus, Ohio

Secondary School Counselors

Ms. JoLynn Brunner, Counselor
Franklin Heights High School
Columbus, Ohio

Ms. Margaret Lunghofer, Counselor
West Muskingum High School
Zanesville, Ohio

Ms. Ora White, Counselor
Brookhaven High School
Columbus, Ohio

Representatives of Admissions Offices of Collegiate Institutions

Mr. Kip Howard, Director of Admissions
Case Western Reserve University
Cleveland, Ohio

Mr. Michael Laymaster,
Vice President for Student Services
Columbus Technical Institute
Columbus, Ohio

Dr. James Walters, Director of Admissions
Ohio University
Athens, Ohio

December 10, 1980

Developmental Education Officers

Dr. David Mitchell, President, Eastern Campus,
Cuyahoga Community College
Warrensville Township, Ohio

Mr. George Simmons, Director
Office of Developmental Education
Lorain Community College
Lorain, Ohio

Ms. Marilyn Smith, Director
Office of Developmental Education
University of Cincinnati
Cincinnati, Ohio

Articulation Model Innovators

Dr. Joan Leitzel, Department of Mathematics
The Ohio State University
Columbus, Ohio

Dr. Gratia Murphy, Department of English
Youngstown State University
Youngstown, Ohio

January 6, 1981

Dr. Richard Adams, Superintendent
Upper Valley Joint Vocational High School
Piqua, Ohio

January 30, 1981

Ms. Mary Poston, Director,
Division of Elementary & Secondary Education
State Department of Education
Columbus, Ohio

APPENDIX D

College Preparatory Programs in Mathematics and English

Recommendations for College Preparatory English Programs in High School

In response to its charge by the Commission on Articulation, the Task Force on English[1] hereby submits its recommendations for the college preparatory curriculum in high school English. While doing so, it wishes to reaffirm that these recommendations are offered in a spirit of collegiality with the teachers of high school English. We are all committed to serving the educational needs of our students and to helping them achieve fluency, ease, and even joy in using their language.

The Task Force has focused the bulk of its energy on recommendations which define the *writing* skills necessary for collegiate entering freshmen. It is in that area that the widest gaps appear between collegiate expectations and high school preparation. This focus on writing

[1] See membership list in Appendix D-I.

is given to define more specifically collegiate composition expectations, it should not be seen as a suggestion to teach less literature, reading, or other language skills in high school.

Prior to offering these recommendations, the Task Force wishes to comment briefly on aspects of the nature of writing which affect the educational goals we all seek. They are process, logic, organization, practice, attitude, and responsibility.

Process

In the view of the Task Force, writing is a non-linear, recursive process which circles from pre-writing, to writing, to reading, to revising and editing, to proof-reading, and 'round again. Final drafts are rarely produced at first sittings.

Logic

Desirable expository writing has logic as its core. It is clear and easy to read. Basic and unskilled writers benefit from understanding how induction from specific examples, deduction from generalizations, fallacies and distinctions between fact and judgment contribute to the accurate expression of thought.

Organization

The purpose for writing is directly related to audience and goal. The structure of a piece of writing should have purpose as its foundation. It is in this key area that many writers have difficulty.

Practice

Like any other skill, writing requires practice for competency. Language skills develop gradually, over time. Therefore, the development of desired writing and reading skills requires practicing these skills on a regular basis, over a considerable period of time, with regular instruction and evaluation by teachers.

It is the strong recommendation of the Task Force that college preparatory high school students write daily. Just as the music teacher does not need to listen to every practice, the English teacher does not need to grade every piece of writing. However, a reasonable sampling does need to be evaluated.

Attitude

A student's perception that he or she is *unable* to write often becomes a self-fulfilling prophecy. Writing can be an intensely personal expression of one's thoughts; comments on those thoughts need to be encouraging, motivating the student to hone his or her writing skills further. The evaluation of writing needs to be as individualized as possible.

Responsibility

Teaching the use of Edited American English in writing and Standard American English in speech is a responsibility to be shared by all teachers, and is not the sole responsibility of English teachers. Writing across the curriculum is crucial; where inservice courses are needed to achieve cross-disciplinary writing assignments, they should be offered.

The remainder of this report is divided into four sections: (I) Overall Definition of Expected Writing Skills; (II) Specific Writing Skills; (III) Reading Skills; (IV) Additional Elements of the College Preparatory Program in English.

(I) Overall Definition of Expected Writing Skills

The Collegiate Task Force on English expects the following writing skills of entering freshmen:

(A) The student writes in an hour a clearly-focused expository (informative, explanatory) essay of about three handwritten pages which has:
  (1) a clearly defined thesis;
  (2) clear and logical organization of ideas;
  (3) supporting details drawn from experience, observation, and/or reading;
  (4) standard paragraphs and sentences of Edited American English (the dialect and grammar used by educated writers of the language).

(B) The student uses standard marks of punctuation and standard spelling.

Mastery of these writing skills is valuable, in the Task Force's view, for several reasons: It prepares students to respond to essay examinations given under similar conditions in other college coursework, and it prepares students to produce written work under the pressure of limited time.

(II) Specific Writing Skills

The following description[2] of student writing skills focuses more specifically on collegiate expectations for entering freshmen. By meeting these expectations, students would be ready for freshman English and would avoid remedial coursework.

It would be difficult to provide a complete list of the prose features that typify satisfactory essays for students beginning freshman English composition. However, it is possible to identify certain key characteristics that regularly distinguish these essays from those of students who must do a great deal of catching up at the beginning of freshman composition

[2] Prepared by Dr. Ronald Fortune of Ohio State University and edited by the Task Force on English for use here.

or who need more writing practice to prepare them for freshman level writing. These key characteristics generally fall into five basic categories: *language, grammar and mechanics, sentence structure, paragraph structure,* and *essay organization.*

Language

In their diagnostic essays, students who are prepared for freshman English will use language that combines a sense of freedom with what one noted authority refers to simply as "a respect for language." That is, they will feel comfortable enough with language to experiment with it in order to find the best way to say what they mean and, at the same time, they will adhere to the conventions of standard English. They will be able to meet the following expectations about how language is used in their essays:

- The diction (choice of words that are correct, clear, and effective) in the essay is specific and original; the writers neither confuse the reader with vague terms nor depend on cliches to communicate ideas that have not been fully expressed. The writers present ideas honestly.
- A level of diction appropriate to the writers' purposes and sensitive to their readers' expectations is maintained throughout the essay. Thus, unless there is a good reason for using slang, it is avoided in an essay in which the reader is expecting a more formal treatment of the topic.
- Phrasing is economical; the writers use only as many words as are necessary to express their ideas. Simple, direct expression of ideas is evident.
- Diction is varied in order to keep prose from becoming repetitious and monotonous. The written vocabulary adequately describes the writers' ideas.

Grammar and Mechanics

The diagnostic essays of students suited to freshman English exhibit a thorough command of grammar and mechanics. The authors of these essays realize that a comma, for example, is not a meaningless mark on paper, but can enable readers to read a sentence with greater efficiency and easier understanding. These writers recognize that grammar and mechanics can be as important to the communication of an idea as the words used to express that idea. Their essays are relatively free of errors in grammar, mechanics, and usage.

The following assertions about grammar and mechanics should be evident in the essays of freshman English writers. They represent common concerns and are not an exhaustive list of grammatical issues.

- Every verb agrees in number with its subject in each of the sentences.
- The verb tenses are consistent and appropriate to the time scheme of the discussion.
- Each pronoun used agrees in number and gender with the noun to which it refers.
- Every modifier is clearly linked to the word, phrase, or clause that it modifies.
- Commas, semi-colons, and colons are correctly used to show how different parts of a sentence (especially introductory phrases, coordinate and subordinate clauses, nonrestrictive modifiers, and items in a series) are interrelated.
- Grammatical forms and punctuation correctly indicate possession.
- Special care has been taken to ensure that spelling is accurate.

Sentence Structure

In addition to using proper grammar and mechanics to tell a reader how a sentence can best be read, students equipped for work in freshman English are able to control their sentences so that the reader can understand their ideas most efficiently. Since sentences are the basic building blocks through which essays are constructed, the readability of an entire essay will depend greatly on how well-controlled its sentences are. Authors of satisfactory diagnostic essays in freshman English generally construct sentences exhibiting the following traits:

- Sentences are of a "digestible" length. They do not attempt to say too much. Material that should be distributed over several sentences is not forced into one.
- Sentences are grammatically complete and contain at least one independent clause with a subject and a verb.
- The main idea in a sentence is correctly placed in a prominent position. In this way, the reader always knows what point the writers want to emphasize.
- The writers use subordination, coordination, and parallel structures in their sentences to suggest how the parts of an idea are interrelated.
- Sentence length and sentence structure are varied in order to emphasize key ideas and to keep prose from becoming monotonous.

Paragraph Structure

Students who are ready to begin freshman English recognize that readers depend on paragraphing not only to help them see quickly the major subdivisions of an essay's controlling idea but also to enable them to focus on the development of each key supporting idea in the essay. These students know that certain principles must govern the relationship of a given paragraph to the rest of the essay and that another set of principles dictates the various plans by which paragraphs can be internally developed. Their awareness of both sets of principles is reflected in their ability to write paragraphs in the following ways:

- Each paragraph focuses on a single aspect of the essay's thesis, often expressing its focus explicitly in a sentence at or near the beginning of the paragraph.
- Each paragraph has a discernable plan for the logical development of the expressed focus. Every plan is based on a logical interaction between a focal generalization and supportive/illustrative/concrete details.
- The details by which a paragraph's generalization is developed are sufficiently articulated and analyzed to make the generalization comprehensible and convincing for a reader.
- All of the paragraphs in the essay are unified and coherent.
- Paragraph transitions are used to relate adjacent paragraphs clearly to one another.

Writing Organization

Students who are ready for freshman English generally understand how to give their writing an overall shape that includes a beginning, a middle, and an end. Knowing that a reader must realize a sense of purpose and direction at every point in an essay, they are careful to establish a main idea at the outset of an essay and to examine systematically and intricately the ideas on which the thesis is based in the rest of the paper. Their writing bears "outer shapes" which can be described by the following:

- The main idea is limited so that the writers are able to develop fully all of the key ideas that support it.
- The main idea is articulated clearly at or near the beginning of the essay. That idea is then developed in detail.
- Sub-topics are discussed in an order suited both to subject matter and to audience.
- The writers are careful throughout the essay to be sure that the reader will know how everything that is discussed is related to the essay's main idea.
- Every sub-topic in the essay is clearly relevant and necessary. At no point do the writers seem to be following a structural formula not suited to the subject matter.
- The writers regularly use transitional devices within and between the essay's subdivisions in order to make the logical progression of ideas apparent to a reader.

None of the characteristics listed here is alone enough to qualify an essay as satisfactory for a student starting out in freshman English. A reader expects that all of these characteristics are present in an essay. To the degree that they are not, that reader will become confused and frustrated. It also should be emphasized that these characteristics do not exhaust the definitive qualities of good writing. Rather, they describe the features of an essay that will be a solid basis from which students can begin to learn to write in freshman English at the collegiate level.

(III) Reading Skills

In addition to having certain writing skills upon entering freshman English, students also should be in command of the basic reading skills that will help them to develop as writers. Entering freshmen should be able to:

- Recognize the topic or thesis statement of a reading assignment.
- Paraphrase the argument and supporting statements of an essay.
- Analyze and evaluate the ways in which supporting ideas are developed in an essay.
- Relate the thesis and main ideas discerned in a reading assignment to a classroom discussion or writing assignment.

In the reading and writing assignments given in post-secondary freshman English, it is assumed that the student has at least a rudimentary grasp of these abilities.

(IV) Additional Elements of the College Preparatory Curriculum in English

In addition to the writing skills outlined above, the Collegiate Task Force recommends that the four-year college preparatory English curriculum include:

A. A survey of American literature (at least one semester; preferably one year).

B. A survey of English literature (at least one semester; preferably one year).

C. At least a brief study of Greek drama and Greek and Roman mythology, as well as Biblical materials which are the source of numerous allusions in the literature of the Western World.

D. Study of the key features of literature (character, plot, image, symbol, theme, point of view, structure). The focus should be on recognition and analysis of the key features, and understanding should be demonstrated through analytical writing about these elements.

E. Basic research processes and strategies. These activities should be designed to help students learn how to focus *their questions* (not teacher assigned questions) and to discover relevant answers through using information sources (libraries, card catalogues, basic indexes, and reference works). The students' work should show an integration of secondary materials with personal opinion. The Task Force believes the research process can be learned in a shortened format, rather than the traditional 5,000 word term paper.

F. Emphasis on reading throughout high school.

G. Listening and speaking skills as integral parts of the college preparatory curriculum. The Task Force views the language arts as a unified whole. Functional, transferable parallels of learning patterns exist between reading and writing, listening and speaking. The high school curriculum should expose students to these logical parallels and provide practice in them.

In summary, the Task Force offers these recommendations as a means whereby high school graduates will be academically ready for collegiate level English.

APPENDIX D-I

Task Force on English

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State Department of Education

Recommendations for College Preparatory Mathematics Programs in High School

The Collegiate Task Force on Mathematics, in response to its charge by the Commission on Articulation, hereby submits its recommendations for the college preparatory program in mathematics. It is offered in a spirit of cooperation with our colleagues who teach at the high school level. Our common goal is better preparation in mathematics for all Ohio students, particularly those intending to enter two-year and four-year colleges.

Recommendations

1. Students should begin the study of algebra after mastering the arithmetic and general mathematics skills outlined in Appendix D-II. (Provision should be made for a high school student to begin the study of algebra in any of the 4 years of high school.)
2. College preparatory students should take a minimum of 3 years of mathematics: Algebra I, Algebra II, and Geometry. (See Appendix D-III for course content recommendations.)
3. Students who intend to pursue a baccalaureate degree in fields requiring courses in collegiate calculus should take 4 years of high school mathematics. (See Appendix D-IV for recommended number of years of college preparatory mathematics for various college programs.)
4. One year of college preparatory mathematics should be taken in the senior year of high school.
5. Courses should emphasize problem solving and should grade students on their ability to solve problems correctly and display problem-solving processes in a clear stepwise fashion.
6. From the start of Algebra I and thereafter, students should have a hand-held scientific calculator for use as a tool in the learning of mathematics.
7. Each college preparatory mathematics course should culminate in a comprehensive examination.
8. At the end of the junior year of high school, the Ohio Board of Regents and the State Department of Education should jointly provide the opportunity for diagnostic mathematics testing which will indicate the individual student's achievement level relative to college entry standards. This measure (such as Ohio State's Early Mathematics Placement Test) should assist in the scheduling of appropriate senior year mathematics courses.
9. Calculus, where offered in the secondary schools, should be at least a full year course and be taken only by those students who are strongly prepared in algebra, geometry, trigonometry, and coordinate geometry. Additionally, the calculus course should be constructed so as to prepare the enrolled students to take the Advanced Placement Examination of the College Board.
10. While not *yet* essential to the college preparatory program, it is highly recommended that students acquire an understanding of the versatility and limitations of the computer through first hand experiences with applications in a variety of subject matter fields. (See Appendix D-V.)

In conclusion, the Task Force on Mathematics endorses the recommendations of the Mathematics Association of America and the National Council of Teachers of Mathematics (See Appendix D-VI.) It shares the serious concern of the National Science Foundation and the U.S. Department of Education which cites slippage in the importance attached to scientific and mathematical education in the United States while other industrialized countries are emphasizing these curricula.[3]

APPENDIX D-II

Task Force on Mathematics

The following arithmetical skills should be mastered before the study of algebra is begun:

1. Computation with whole numbers, fractions, and decimals.
2. Applications of percent.
3. Translation of situations and verbal problems into mathematical statements.
4. Facility in rounding and approximation.
5. Understanding and use of basic arithmetic properties.
6. Efficient use of calculator.
7. Use and interpretation of graphs and tables.
8. Meaning of mean, mode, median.
9. Computation with exponents and square roots.

[3] National Science Foundation and U.S. Department of Education, "Report to the President of the United States: Science and Engineering Education for the 1980's and Beyond". Washington: October, 1980.

APPENDIX D-III

Task Force on Mathematics

Students preparing for two-year or four-year colleges need a minimum of 3 years of college preparatory mathematics: Algebra I, Geometry, and Algebra II. Many students need 4 years of college preparatory mathematics (See Appendix D-IV.) The content of the recommended college preparatory courses is given below:

Two years of Algebra to include:

Simplification of algebraic expressions

Integer exponents

Fractional exponents and radicals

Absolute value and inequalities

Solution of linear equations and inequalities in one variable

Ratio, proportion, and variation

Products and factoring

Operations on polynomials

Complex numbers

Solution of quadratic equations by factoring, completing the square, using the quadratic formula

Solution of quadratic inequalities

Graphing linear and quadratic functions and inequalities, including the determination and interpretation of slopes

Solution of equations with rational expressions

Graphing rational functions

Solution of systems of linear equations (two equations in two unknowns, three equations in three unknowns)

Binomial theorem

Solution of polynomial equations

Arithmetic and geometric progressions

Exponential and logarithmic functions and equations

Analysis and solution of word problems (including estimation and approximation) shall be emphasized throughout the above sequence of topics.

Geometry:

Angles, parallel lines, congruent and similar triangles, circles and arcs, Pythagorean Theorem

Application of formulas for perimeters, areas, volumes, and surface areas

Basic postulates of Euclidean geometry; construction of proofs of geometric theorems

Experience in visualizing and drawing three-dimensional figures

Right triangle trigonometry

If course time remains, coordinate geometry and constructions.

The 4th year of college preparatory mathematics should contain a semester of trigonometry plus a semester of either analytic geometry or probability and statistics.

Trigonometry (One Semester):

Trigonometric functions as ratios of lengths of sides of triangles and as circular functions

Graphical characteristics of trigonometric functions

Solution of right triangles

Radian and degree angular measure

Trigonometric identities including double angle, half angle and addition formulas

Law of sines and cosines

Inverse trigonometric functions and their graphs

Solution of trigonometric equations

Trigonometric form of complex numbers and De Moivre's Theorem.

Analytic Geometry (One Semester):

Analytic Geometry, a traditional course in coordinate geometry including conic sections; rational functions and their graphs, polar coordinates, parametric equations and their graphs.

Probability and Statistics (One Semester):

Using topics as found in a typical statistics textbook:

Descriptive Statistics—frequency distributions

Means, medians, variance

Probability

Distributions: Binomonial, Normal, . . .

Statistical Inference: Sampling distributions, confidence intervals, hypothesis testing

Regression and Correlation.

APPENDIX D-IV

Task Force on Mathematics

Listed below are the recommended number of years of college preparatory mathematics for various baccalaureate programs. Three years means Algebra I, Geometry, and Algebra II. Four years means Algebra I, Geometry, Algebra II, and a fourth year of either trigonometry/analytic geometry or trigonometry/probability and statistics.

Program	Recommended Years of College Preparatory Mathematics
Agriculture:	
— Agricultural economics	3
— Entomology	3
— Environmental sciences	4
— Food sciences	3
— Forestry	3
— Genetics	3
— Landscape architecture	3
— Plant pathology	3
— Rural sociology	3
— Wildlife ecology	3
— Other areas of agriculture	
Architecture	3
Art	3
Business:	
— Accounting	4
— Economics	4
— Management	4
Communications	3
Education:	
— Elementary	3
— Child Development and Preschool	3
Engineering	4
History	3
Language and Literature	3
Law	3
Life sciences:	
— Bacteriology	4
— Biochemistry	4
— Biology	4
Linguistics	3
Mathematical sciences:	
— Mathematics	4
— Statistics	4
— Actuarial sciences	4
— Computer science	4
Medicine:	
— Allied medicine	3
— Dental hygiene	3
— Dentistry	4
— Medical technology	4
— Nursing	3
— Optometry	4
— Physical therapy	3
— Pre-medicine	4
— Public health	3
Music	3
Pharmacy	4
Philosophy	3
Physical sciences:	
— Astronomy	4
— Chemistry	4
— Geology	4
— Physics	4
Social sciences:	
— Anthropology	3
— Asian studies	3
— Black studies	3
— Geography	3
— Political science	3
— Psychology	4
— Sociology	3
Theater	3

APPENDIX D-V

Task Force on Mathematics

Programs designed to take full advantage of the multidisciplinary potential of computers should include the following:[4]

- Problem solving
- Simulations that give the opportunity to practice decision making
- Lessons that introduce and develop concepts
- Word processing to develop communication skills
- Data retrieval tasks such as career information services
- Simulation that replaces dangerous, expensive, or technically difficult laboratory work
- Programming
- Drill-and-practice programs
- Student-operated computer services within the community
- Teacher-support services
- Functions that improve the evaluation process.

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[4] National Council of Teachers of Mathematics, "Computers in the Classroom" position statement, 1980.

APPENDIX D-VI Task Force on Mathematics

RECOMMENDATIONS

The Board of Governors of the Mathematical Association of America and the Board of Directors of the National Council of Teachers of Mathematics make the following recommendations:

1. Proficiency in mathematics cannot be acquired without individual practice. We, therefore, endorse the common practice of making regular assignments to be completed outside of class. We recommend that parents encourage their children to set aside sufficient time each day to complete these assignments and that parents actively support the request of the teachers that homework be turned in. Students should be encouraged to develop good study habits in mathematics courses at all levels and should develop the ability to read mathematics.

2. Homework and drill are very important pedagogical tools used to help the students gain understanding as well as proficiency in the skills of arithmetic and algebra; but students should not be burdened with excessive or meaningless drill. We, therefore, recommend that teachers and authors of textbooks step up their search for interesting problems that provide the opportunity to apply these skills. We realize that this is a difficult task, but we believe that providing problems that reinforce manipulative skills as a byproduct should have high priority, especially those that show that mathematics helps solve problems in the real world.

3. We are aware that teachers must struggle to maintain standards of performance in courses at all levels from kindergarten through college and that serious grade inflation has been observed. An apparent growing trend to reward effort or attendance rather than achievement has been making it increasingly difficult for mathematics teachers to maintain standards. We recommend that mathematics departments review evaluation procedures to insure that grades reflect student achievement. Further, we urge administrators to support teachers in this endeavor.

4. In light of 3 above, we also recognize that advancement of students without appropriate achievement has a detrimental effect on the individual student and on the entire class. We, therefore, recommend that school districts make special provisions to assist students when deficiencies are first noted.

5. We recommend that cumulative evaluations be given throughout each course, as well as at its completion, to all students. We believe that the absence of cumulative evaluation promotes short-term. We strongly oppose the practice of exempting students from evaluations.

6. We recommend that computers and hand calculators be used in imaginative ways to reinforce learning and to motivate the student as proficiency in mathematics is gained. Calculators should be used to supplement rather than to supplant the study of necessary computational skills.

7. We recommend that colleges and universities administer placement examinations in mathematics prior to final registration to aid students in selecting appropriate college courses.

8. We encourage the continuation or initiation of joint meetings of college and secondary school mathematics instructors and counselors in order to improve communication concerning mathematics prerequisites for careers, preparation of students for collegiate mathematics courses, joint curriculum coordination, remedial programs in schools and colleges, an exchange of successful instructional strategies, planning of in-service programs, and other related topics.

9. Schools should frequently review their mathematics curricula to see that they meet the needs of their students in preparing them for college mathematics. School districts that have not conducted a curriculum analysis recently should do so now, primarily to identify topics in the curriculum which could be either omitted or de-emphasized, if necessary, in order to provide sufficient time for the topics included in the above statement. We suggest that, for example, the following could be de-emphasized or omitted if now in the curriculum.

   (A) logarithmic calculations that can better be handled by calculators or computers.

   (B) extensive solving of triangles in trigonometry.

   (C) proofs of superfluous or trivial theorems in geometry.

10. We recommend that algebraic concepts and skills be incorporated wherever possible into geometry and other courses beyond algebra to help students retain these concepts and skills.

APPENDIX D-VII

Commission on Articulation

Task Force on Mathematics

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Ohio Board of Regents

APPENDIX E

Graduates Completing the Following Courses Are Eligible for the State Board of Education Award of Distinction

English—4 units (See Appendix D for details)

Mathematics—3 units (Algebra I, II, and Plane Geometry. See Appendix D for details)

Science—3 units (Must include 2 units from among Biology, Chemistry, and Physics)

Social Studies—3 units (Must include 2 units of History and ½ unit of Civics or Government)

Foreign Language—3 units (Must include no less than 2 units of any language for which credit is sought, i.e., 3 units of one language or 2 units each of two languages).

An Equal Opportunity Employer